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HYDRO ELECTRIC POWER COMMISSION OF ONTARIO



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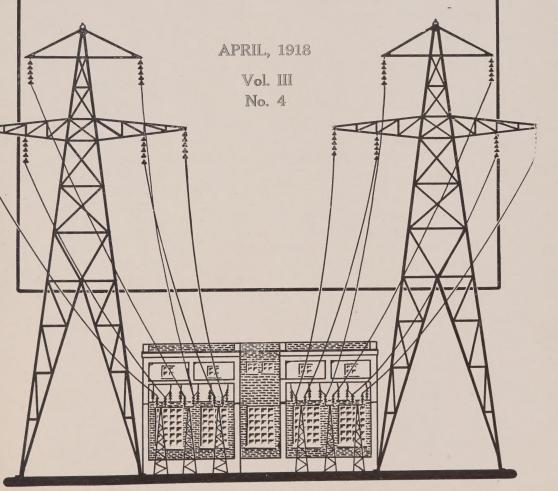
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EDITORIAL

VERY municipal manager, superintendent, and engineer who attended the last meeting

on March 13th and 14th, of the Engineers' Section, Ontario Municipal Electrical Association, is to be congratulated on the organization and formation of the Association of Municipal Electrical Engineers, in response to a popular demand for a live and useful organization of their own. An account of the meeting is contained in this issue of The Bulletin which by the way, has been honored by being selected as the official publication of the new Association. We wish the Association a long and successful life of increasing usefulness to the municipal electrical interests of the Province. We would also emphasize to municipal officials, particularly the non-technical and elected officials, that the new Association was formed entirely with a view of being of greater usefulness than the old Engineers Section and of co-operating to the fullest extent with the Hydro Electric Commission and the Ontario Municipal Electrical Association.

The new Association starts out with a live executive an enthusiastic membership and the encouragement of the Hydro-Electric Power Commission of Ontario, but its future success will depend entirely upon the whole hearted support of the municipalities of the Province, and the officials who represent them. The good to accrue will be in proportion to the earnest work done by its members.





Rating of New Hydro Series Lamps for Street Lighting

By A. G. Lang



RIGINALLY incandescent carbon lamps, both series and multiple, were rated in candlepower.

When the tungsten lamp was introduced the rating for the multiple lamps was changed to watts, while that of the series lamps was continued in candle power. No doubt the candle power rating for the series lamps was not changed at this time in view of the contracts in force between municipalities and supply companies, in which it was provided that lamps of a certain candlepower should be used.

It might appear at the first glance that the "candle-power" of a lamp should denote definitely the amount of illumination afforded. This is not the case. It does express imperfectly the intensity of the light, but it is not a reliable measure of the total illumination emitted by the lamp. The term "candle-power" is generally accepted as an abbrevia-

tion of "mean horizontal candlepower." This value in the case of an incandescent lamp, is obtained by rotating the lamp, while held tip down, about a vertical axis and observing, by means of a photometer, the resulting candle-power in a horizontal plane through the centre of the filament. It will be evident that this method of measurement does not take into account the light in any direction from the lamp other than the horizontal, and therefore is not a measure of the total light emitted. Furthermore, it was found in the case of gas filled lamps that various values were obtained by varying the speed of rotation.

The intensity of light in all directions from the source may be measured and expressed by the designation "mean spherical candle-power." This term is somewhat clumsy and permits of some confusion with the term "mean horizontal candle-power." It has therefore become the standard practice to rate the illumi-



nation from a light source in "lumens." As the term "candlepower" in this connection will ultimately no doubt be dropped in favor of "lumen", it is advisable for all concerned to become familiar with the meaning of the latter term. A lumen is the amount of light flux emitted in a unit solid angle by a source of one candle. From this definition it follows that the total flux emitted from a source of one candle is 12.57 lumens. The candle here referred to is the unit of luminous intensity maintained by the national laboratories of France, Great Britain and the United States. For rough comparison it is of interest to note that if the old candle-power rating is multiplied by 10 the result will be approximately the rating of the lamp in lumens, i.e. a lamp of 100 C.P. according to the old rating is approximately of 1,000 lumens according to the new rating.

In making tests at the Commission's laboratory on series lamps supplied by the manufacturers, it was found that the lamps were fairly close to the manufacturers' rating in lumens but that the various makes of lamps differed widely in watts consumption, the latter in some cases being very much greater than that specified in data supplied by the manufacturers. Also the manufacturers, while maintaining the candle-power rating, have several times changed the watts consumption, not in every case reducing the watts consumption, as would naturally be expected considering the increasing experience and the new developments in the manufacture of lamps. Such a condition is unsatisfactory, in one respect in view of the fact that the regulating apparatus on a series circuit has a definite and limited capacity for lamp load.

An investigation was made also by the Commission on economical lamp efficiencies and it was found that the series gas-filled lamps supplied by the manufacturers were not the most suitable for use in Hydro Municipalities where low power rates prevail.

It was decided, in view of the foregoing, to draw up a specification for series gas-filled lamps which would contain the following features:—

1. The lamps should be rated in watts instead of in candle-power as formerly.

This provides that the power required by a given number of lamps is readily determined. It also provides that when improvements are made in lamp manufacture so that more light is obtained for a given wattage, the watts consumption will be held constant and the illumination from the lamp increased. In this way the public will benefit by the increase of light on the streets. Also the same number of lamps will require the same capacity in the constant current transformers, when the lamp efficiency is changed.

- 2. The lamps should be designed to have a life of 4,000 hours. This lamp will require only one renewal per year. The standard lamp as supplied by the manufacturers has a rated life of 1,350 hours, at which rate of burning there would be required three renewals per year.
- 3. The illumination given by the lamps should be expressed in lumens. This is in accordance with the practice which will soon become general.

Lamps manufactured to these specifications have been purchased by the commission and are now in service in a number of Hydro municapilities. To date, in laboratory tests, these lamps have fully met our expectations.

For those who are not familiar with the new ratings is given below a table showing the standard sizes in which these lamps may be obtained; the table shows also a list of lamps rated as formerly in candle-

power. Where lamps of any given candle-power are in service which were purchased under the old rating the renewals should be made with lamps of the new rating which appear on the corresponding line in the first column.

New	Hydr	o Rating	Old Rating
80	watts		100 C.P.
100	4.6		150 ''
250		66000000	400 "
400	4.4	6.6 amperes	600 "
500	"		750 "
750	"		(1,000 "
400	watts	20 amperes	∫ 600 C.P.
500		20 amperes	1,000 "



Electrical Thawing of Water Pipes

By Fred C. Adsett

Local Manager, Hydro-Electric Power Commission of Ontario



afford a protection to the earth. Thus the frost got off to a good start in its descent through the ground, and soon succeeded in gripping the water pipes in a frigid embrace of no mean consequence. In view of the extensive trouble experienced on this account with the freezing of water services throughout the country, a description of the thawing apparatus used at Trenton might be passed by our editors.

Electrical thawing of water pipes comes near to being the ideal method of overcoming the difficulty. There is no digging, no splitting of pipes, nor shutting off of the water to other consumers. All that is necessary is to connect a wire to each end of the frozen pipe and pass sufficient current through the circuit. The chief drawback is the extremely severe weather at times encountered by the linemen while at this work.

The thawing outfit used at Trenton consists of a transformer, cutout, water resistance, ammeter, switch, and reels of wire. A 15-K.W. transformer has been used all

winter, connected to give 110 volts on the secondary side. To regulate the current a barrel of salt water is provided; the resistance used however is generally very small. The switch is on the secondary side; the ammeter is of the portable type. Near the transformer is a small reel of 8-W.P. wire; this wire is used to connect the cut-out to the live primary. Connection is made to a bare primary without danger by a clip device on a long wooden stick.

At the back of the sleigh are two larger reels each containing five hundred feet of No. 1 copper. These reels are turned by a crank when the wire is to be rewound. The primary distribution system in Trenton is 3-phase, 4-wire, with 2,200 volts between any phase and the neutral, or ground. Hence only one side of the transformer primary need be connected to the line, the other side is permanently grounded to one of the large secondary wires. Two men are required to operate the outfit efficiently, sometimes three are used; the entire equipment is hauled by one horse.

Practically all the trouble encountered this year has been in wrought iron service pipes; these are generally ½ inch pipes, but occasionally are 1 inch and two

inches in diameter. For the ordinary 1/2-inch service pipes we have found that 180 amperes are the most efficient. This current is sufficient to heat the empty pipes to about 200° F. in fifteen minutes. but with water running in the pipes. this temperature will not be attained. At times however obstacles are encountered, such as where the water is frozen in the brass shut-off cock. For thawing services only. and where the main is free from ice. the two secondary wires may be attached at two different houses that are without water; both are thus thawed out at the same time.

The resistance of the main between the two services is naturally very small. Sometimes as many as six or eight services may be thawed at one set up. To thaw a main, care must be taken to have one wire connected ahead of the freezeup, and the other on any convenient lawn or house

tap along the main. At times it is necessary to attach to the curb cock outside, which is done by lowering the ordinary turn-off key with connection at the top end of it.

To thaw larger pipes a 25-K.W. transformer is hauled out on another sleight; this has not been necessary this winter. As high as 200

amperes have been taken from the 15-K.W. transformer when necessary, care having been exercised to not expect too much of an overload from it. The 2-inch pipe requires from one to three hours to heat up.

The secondary wire is attached to the water pipes by being wrapped with a short piece of No. 8 bare aluminum of which there is a supply of scrap on hand. Variations from the usual sometimes occur. At times a transformer on the line is handy and may be used in place of that on the sleigh. In one case after disconnecting the ground connection we have attached the line side

of the 110-volt service in the cellar direct to the water pipes. In this way the current flowed to the ground connection of a neighbor and registered 62 amperes without resistance. This house had No. 6 wire in the service conduit and was fed from the 20-K.W. transformer.



Trenton's Pipe Thawing Outfit

Nor is the use of electrical thawing confined to water pipes alone. We frequently are requested to thaw soft water pipes, soil pipes, and even sewer pipes. In Guelph, last winter, an underground cable was thawed in a conduit which had been flooded and frozen. Fifty amperes loosened this cable in thirty minutes,

after steam had been tried for two days.

As the Electric and Water Utilities both come under the one management in Trenton, some thawing jobs are charged direct to the Water Department. In cases where the consumer bears the expense, the time of the men and horse and the current used plus a small profit for depreciation of the apparatus has averaged in the past between \$1.50 and \$2.25. This compares very favorably with the prices given in the Electrical World of recent date, where in Binghampton, New York, the average return for each job was \$13 with a minimum of \$10.

The average number of thawing jobs completed in one day would range from six to twelve, depending upon how they might be grouped. Where the Electric Department is entirely distinct from that of the Water Department there should be a good revenue netted from this work. There is also the satisfaction of supplying a timely service to the people, which is the ultimate object of the Hydro Electric Power Commission of Ontario.

Electrical Appliance Sales



CCORDING to information contained in the *Electrical World* recently the sale of electrical appliances has shown a healthy

growth. In the American West it seems that the public is now buying more expensive articles, having been educated to the point where it fully realized the advantage of electricity in the home. High grade vacuum cleaners and other apparatus requiring a considerable investment seems to be selling readily.

Information supplied by the Minneapolis General Electric Company is interesting in showing the relative number of appliances sold during the first ten months of 1917. During this period 13,545 electrical appliances were said to have been placed on the company's lines, Flat irons were the most popular, numbering 4,601, vacuum cleaners followed with 3,091. Other appliances in the order of their importance were as follows:

Toasters
Washing-machines612
Heating Pads401
Grills
Curling Irons343
Percolators324
Ranges
Air Heaters
Vibrators
Water Heaters
Luminous Radiators 96
Chafing Dishes 85
Hot Plates 84
Miscellaneous

Many power companies, owing to the power shortage, are turning their power solicitors into appliance solicitors for the time being, the desire being to increase their appliance load and the sale of off-peak power. Despite the high prices of all apparatus the consumer appears to be buying labor saving devices in increasing quantities. The scarcity of help and high wages generally prevailing are apparently responsible for this condition.

Minutes of Meeting, Engineers' Section, O.M.E.A.

Held in Lecture Room C-26, Chemistry and Mining Building, University of Toronto, March 13 and 14, 1918

Afternoon Session, March 13th



HE meeting was called to order at 3 o'clock Mr. E. V. Buchanan, Chairman, giving a short address of welcome to

the members and outlining the purposes for which they were called together.

Moved by Mr. Ferguson, seconded by Mr. Coleman:

That the minutes of the previous meeting be passed without being read. *Carried*.

The Chairman next asked for the report of the Committee which had been appointed at the previous meeting, to inquire into the legislation covering tree trimming. Since Mr. R. T. Jeffery was unable to be present at this session, this was left over to be taken up on the following morning.

The confusion resulting from the name used by the Inspection Department, found the next subject for discussion. Messrs. Yates, Sifton, Coleman, Perry, Stapleton, Caughell, Hicks and Scott spoke on this subject outlining the difficulties they were experiencing from this confusion.

Moved by Mr. Yates, seconded by Mr. Caughell.

That a Committee be appointed to call upon the Chairman of the Provincial Commission to present our reasons for wishing the Inspection Department to remain as at present under the Provincial Commission, but that the name now in use should be changed in some way to overcome the objections in Municipalities, and that a memorial be signed by all of the members present. *Carried*.

The foregoing subject lead to consideration of difficulties arising out of the application of the Inspection Department rules, Messrs. Jackson, Scott, Yates, Shearer, Espenschied, James and Childs speaking.

Moved by Mr. Jackson, seconded by Mr. McIntyre:

That the Committee arrange for a paper on this subject to be presented and discussed at the next meeting, and that the members of the Rules and Regulations Committee of the Commission, be requested to be present. *Carried.*

Reorganization of the Association was next taken up, when Mr. Yates as mover of a resolution that had been prepared by the Executive Committee asking for a reorganization, outlined briefly the reasons for taking this move. Mr. Perry spoke as seconder of the resolution.

Messrs. Sifton, Childs, McIntyre, Jackson, Phelps, Espenschied, Caughell, Scott, Skidmore, Hicks, Fish, Heeg, Ashworth, Wilson, Stapleton, Curry, McHenry, Chant, Shearer, Martindale, Adsett and Coleman, all expressed themselves highly in favor of the move. There was no adverse comment.

Mr. Sifton advised that the Executive Committee of the Ontario Municipal Electrical Association was in session, drawing up a new form of constitution and that they had requested to be permitted to wait on this Association before any definite action was taken. Further discussion was deferred until the next morning.

Mr. Yates reminded the meeting of the reports that the Commission proposed enforcing a third consumption rate for domestic service, and considered such action as undesirable under the present conditions. Mr. Kribs spoke in defence of this change, pointing out that it had taken place only in Ottawa where there was a surplus of power, and other conditions entirely different from those obtaining in any other district. He stated that Municipality had been given a third consumption rate of a half cent per kilowatt hour, for all consumers over 6 kw.-hr. per month for 100 square feet of floor area, with the object of building up an electric range load.

Moved by Mr. Yates, seconded by Mr. Jackson:

Bearing in mind the present shortage of power in the Niagara, Eugenia and Severn Districts, the excessive cost of construction to take care of increases in load, and the desirability of financing the maximum amount of construction from earnings, be it resolved that this Association respectfully requests the Hydro-Electric Power Commission of Ontario, not to approve under existing conditions, a reduction in domestic lighting rates below the present minimum of 3c, 2c and 1c with a 10% discount, or the introduction of a low third rate for domestic lighting. *Carried*.

In moving this resolution, Mr. Yates outlined the following reasons for doing so.

The domestic lighting rates as now used are very low. If they are brought down any lower there would be an increase in the heating load.

Decreased rates cause increased loads which necessitate increasing the amount of copper in the distributing systems.

Any surplus derived from service should be used in improving the service and in putting the distributing systems underground.

The meeting adjourned at 5.30 p.m.

After adjournment the members met at the Administration Building of the Hydro-Electric Power Commission of Ontario, where the Commission entertained them at dinner.

Brief addresses were given by Hon. Colonel Sir Adam Beck, Mr. Gaby, Mr George Leacock, Commissioners Sanderson of St. Thomas, Ellis of Hamilton, Mr. T. J. Hannigan, of Guelph, and Mr. J. E. B. Phelps of Sarnia. Mr. H. F. Strickland with his orchestra also contributed a musical program.

Morning Session, March 14th

The meeting was called to order at 10.30 o'clock

A resolution was passed that a hearty vote of thanks be extended to the Commission, and to Mr. Strickland and Mr. Plant, for their entertainment of the previous evening. *Carried*.

In reporting on the legislation, governing tree trimming, Mr. Jeffery advised as follows:

That he had consulted Mr. Pope on this matter and had been advised that all Municipalities have the matter of tree trimming in their own hands. Any Municipality can by by-law, decide how to handle this work, whether by local improvement or otherwise. According to the Act, the council has full control of the trees no matter who has planted or owns them. Trees planted on private property and overhanging the highway, come under the same Act.

Pursuant to the resolution passed during the previous afternoon sess'on, the following petition was read and then signed by all the members:

То

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

WHEREAS the Electric Inspection Department of The Hydro-Electric Power Commission of Ontario, being so named, is the cause of endless confusion between that Department and The Municipal Hydro-Electric Utilities.

AND WHEREAS the use of the words "Hydro" and "Power" in

the forms and letterheads of that department is the primary cause of misunderstanding and dissatisfaction between consumers, prospective or actual, and the Municipal Utilities.

We, the undersigned Engineers, Managers, Superintendents, etc. of The Municipal Hydro-Electric Utilities HEREBY PETITION your honorable body that the name of the Inspection Department be changed so that its connection with the Hydro-Electric Commission be not so obvious. We would suggest that the name be, "The Electric Inspection Department of Ontario," leaving the control of the department with the Commission, as at present.

We wish to express our confidence in the Commission and desire that the Inspection Department be retained under their competent control.

Messrs. Heeg, Scott, Stapleton and Buchanan were named a Committee to wait on the Chairman of the Commission and present the petition.

The meeting then returned to the discussion of the resolution that had been moved the previous afternoon in reference to re-organization. Messrs. Sanderson, of St. Thomas, Ellis, of Hamilton, and Hannigan, of Guelph were present as a Committee which was drafting a new constitution for the Ontario Municipal Electrical Association, who outlined to the meeting what that Association proposed doing. They gave their hearty approval of the proposed reorganization of this Association.

Resolution moved by Mr. Yates, seconded by Mr. Perry:

"That since we have been unable to effect a proper organization of Municipalities to consider operation and engineering questions of policy through the formation of the associations originally laid down as an engineering branch of the Ontario Municipal Electrical Association, be it resolved that we recommend the establishment of an association of the managers, superintendents and engineers of the different Municipal Electrical Utilities free from the Ontario Municipal Electrical Association and financially independent." Carried, unanimously.

The meeting then took up the consideration of the draft of Constitution and By-laws, each clause being read and discussed separately. The discussion on the constitution took up the remainder of the time allotted to this session.

The meeting adjourned at 12 o'clock noon.

Afternoon Session, March 14th

The meeting was called to order at 2 o'clock.

The consideration of the By-laws was continued. The Constitution and By-laws as amended were then read by the secretary being as follows:

ASSOCIATION OF MUNICIPAL ELECTRICAL ENGINEERS OF ONTARIO CONSTITUTION

This organization shall be known as the Association of Municipal Elec-

trical Engineers (of Ontario), and it is organized for the following purposes, to wit:

- 1. To further the interest of Municipal Electrical Utilities in Ontario and to foster closer co-operation between the Municipalities and with the parent organizations, viz., The Hydro-Electric Power Commission of Ontario and The Ontario Municipal Electrical Association.
- 2. For the mutual assistance of its members, education along technical and commercial lines, and the standardization of methods, apparatus and materials.

BY-LAWS

MEMBERSHIP.

Membership in the Association shall be open to Ontario Municipal Electrical Utilities, operated locally or by the Hydro-Electric Power Commission of Ontario.

Each Member Utility is entitled to representation by delegates of the following active classes:

Class "A." Class "B."

A Class "A" delegate shall be the chief operating executive or other authorized representative of any Ontario Municipal Electrical Utility or Local Electrical Utility operated by the Hydro-Electric Power Commission of Ontario, and only one such delegate from each Municipality will be permitted.

The Ontario Municipal Electrical Association shall have the privilege of holding two Class "A" memberships.

A Class "B" delegate shall be any other Commissioner, official or employee of any Ontario Municipal Electrical Utility.

ASSOCIATE MEMBERSHIP

Persons not eligible for either of the former two classes may be elected as Associates by a two-thirds majority vote of the Class "A" delegates present at any general meeting of the Association.

PRIVILEGES

Class "A" delegates shall be eligible for any office in the Association, and shall hold the only voting rights. The presiding officer at any meeting shall vote as a delegate and in case of a tie, shall also have the deciding vote.

Class "B" delegates shall be eligible for any office in the Association other than President and Vice-President.

Associates shall be eligible for any office in the Association, excepting President, Vice-President, and Chairmanship of standing committees.

In all other respects the entire membership shall enjoy equal privileges, one class with another.

OFFICERS

The officers of the Association shall be President, Vice-President, Secretary, Treasurer and Chairmen of the Standing Committees. They shall each hold office, after being duly elected, for one calendar year, or until their successors are chosen, unless suspended for cause by a two-thirds majority vote of the Class "A" delegates present at any general meeting of the Association.

MEETINGS

Meetings shall be held from time to time; but not less than twice each calendar year, the month and place of meeting having been selected by the Association at a prior meeting.

A quorum for the purpose of transacting business shall consist of a majority of the officers, and in addition Class "A" delegates from not less than twenty per cent. of the Member Utilities.

Motions shall be passed by the majority vote of all Class "A" delegates present at a legal meeting.

Special meetings for specific purposes may be held at any time and place on the call of the President or on the written demand of at least 10 per cent. of the Member Utilities.

STANDING COMMITTEES

The standing committees of the Association shall be as follows:

- 1. Membership and Credential's Committee.
 - 2. Papers Committee.
 - 3. Convention Committee.
- 4. Rules and Regulations Committee.

Each Committee shall consist of a Chairman, with at least two other committee members elected by the Association at large.

The Chairmen of these standing committees, with the Executive officers of the Association, shall constitute the executive committee.

The president is a member exofficio of all committees.

ELECTIONS

The election of officers and standing Committees shall take place at the first regular meeting in each calendar year.

The Presiding officer at this meeting (President or Vice-President) shall select from the Class "A" delegates present, three men to act as a Slate or Striking Committee, who shall immediately adjourn and prepare a suggested list of officers and members of standing committees to be voted upon, at least two names being suggested for each office.

Other nominations made by the meeting at large will be permitted, including the nominees of the Slate Committee.

Voting shall be by ballot, and each Class "A" delegate present shall have one vote for each officer—the majority of the votes cast shall elect. A separate ballot shall be taken for each office.

The new officers shall take their positions immediately after the dissolution of the general meeting at which they are elected.

FEES

An annual fee shall be assessed against each member Utility in accordance with the following scale, based upon the number of electrical consumers at the end of the previous calendar year.

Less than 250	consumers	\$2.00
251 - 500		5.00
501 - 1,000	6.6	7.50
1,001 - 2,000		10.00
2,001 - 3,000		15.00
3,001 - 5,000		25.00
5,001 -10,000	4.6	35.00
Over 10,000		50.00

Any membership may be suspended or cancelled by a two-thirds majority vote of the Class "A" delegates present at a legal meeting of the Association for arrears or non-payment of dues. Dues shall be considered in arrears if not paid on or before March 31st of each year.

The Treasurer shall be custodian of all monies of the Association and shall render an accounting in writing in proper form at least once annually, viz., at the first meeting in each calendar year, so that the membership may be acquainted with the finances of the Association prior to balloting for new officers. It shall be the duty of the Treasurer to collect all dues.

No funds of the Association shall be paid by the Treasurer except on warrants signed by the President and Secretary, and no personal liabilities shall be attached to the Treasurer for expenditures duly authorized by the Association.

TRANSACTIONS

The transactions of the Association shall be published in "The Bulletin" of The Hydro-Electric Power Commission of Ontario as Official organ of the Association.

AMENDMENTS

Notices of motion of proposed amendments of the constitution and By-laws must be included with notices of meetings.

Moved by Mr. Sifton, seconded by Mr. Caughell,

That the Constitutional and Bylaws as amended and read, be adopted. *Carried unanimously*.

The election of officers for the coming year was the next order of business. Messrs. McIntyre, Stapleton and Scott were named as a slate or striking committee.

Moved by Mr. Sifton, seconded by Mr. Phelps:

That this meeting constitute itself a properly organized Association for the purposes of this meeting. *Carried*.

While waiting for the return of draft Committee and during the balloting for offices the following further business was transacted.

Moved by Mr. Sifton, seconded by Mr. Myers.

That the next meeting be held at Niagara Falls, on June 14th, and 15th, 1918. *Carried*.

Mr. Sifton gave notice of motion to amend the By-laws by changing the first clause under Privileges by inserting after the word "rights," the words "at general meetings."

Mr. Stapleton brought up the question of employers liability insurance, maintaining that the charges of the insurance companies seem too high. This subject was discussed by Messrs. Sifton and Buchanan. Mr. Buchanan suggested the formation of a pension system for Municipal Utilities.

Mr. McCollum suggested that there be uniform rates for thawing water pipes, pointing out that at present there is a great variation in the charges used in the various municipalities. Though this subject was discussed by a number of the members, yet no action was taken.

The officers elected for the coming year were:

President . . . E. V. Buchanan Vice-President . . E. I. Sifton Secretary S. R. A. Clement Treasurer R. C. McCollum

Membership and Credential's Committee:

Chairman, Oswald F. Scott; P. B. Yates; J. J. Heeg; W. E. Reesor and E. H. Caughell.

Papers Committee:

Chairman, V. S. McIntyre; H. H. Couzens; H. D. Rothwell; F. F. Espenschied and L. G. Ireland.

Conventions Committee:

Chairman, E. J. Stapleton; J. E. B. Phelps; A. T. Hicks; J. R. Mc-Linden and O. M. Perry. Rules and Regulations Committee: Chairman, R. H. Martindale; J. G. Archibald; B. B. Coleman; H. O. Fisk and T. C. James.

The President appointed the Chairmen of the standing committees as a slate or striking committee for next year.

The meeting adjourned at 5 p.m.

The following members were present:

Aurora: A. Langman, Superintendent; Beaverton: Roger Clark, P. E. Byrne, Sec. Commission; Belleville: Oswald F. Scott, Loc. Mgr., H.E.P. C.; Bowmanville: G. E. Chase, Loc. Mgr., H.E.P.C.; Brampton: George Ostrander, Superintendent;

Brantford: W. P. Catton, Superintendent: Brighton, R. O. Quick, Loc. Mgr., H.E.P.C.; Brockville: J. A. Johnston, Manager; Cannington: J. E. Cornfoot, Superintendent; Chatham: J. G. Jackson, Manager; Clinton: H. B. Chant, Superintendent; Cobourg: J. E. Skidmore, Local Manager, H.E.P.C.; Collingwood: E. J. Stapleton, Superintendent, H. A. Currie, Chairman, Commission, S. Burnside, Commissioner, W. B. H. Patton, Mayor; Dundas: R. W. Karsh, Chairman, Commission, George E. Whiton, Superintendent: Galt: R. Elliott, Superintendent; Guelph: John J. Heeg, Secretary, Commission; Hamilton: E. I. Sifton, Chief Engineer and General Manager, W. H. Childs, Assistant and Manager: Ingersoll: H. G. Hall, Superintendent; Kitchener: V. S. McIntyre, Manager; Lindsay: W. E. Reesor, Local Manager, H.E.P.C.; London: E. V. Buchanan, General Manager; Merritton: W. R. Sevigny, Superintendent; Midland: S. J. Milliken, Manager; Millbrook: Geo. F. Harrington, Local Manager, H.E.P.C.; Mimico: Thos. E. Bell, Superintendent; Napanee: Chas. A. Walters, Local Manager, H.E.P.C.; New Hamburg, Geo. Morley, Superintendent; New Toronto: J. W. Cook; North Bay: H. D. Rothwell, Local Manager, H.E.P.C.; Norwich: W. Daykin, Superintendent; Oshawa: A. T. Hicks, Local Manager, H.E.P.C.; Owen Sound: J. R. McLinden, Superintendent; Perth: R. J. Smith, Manager; Peter-

borough: H. O. Fisk, Chief Engineer and General Manager, William G. Ferguson, Manager, Street Railway; Port Hope: V. B. Coleman, Local Manager, H.E.P.C.; Port Stanley: E. C. H. Plewes, Manager: Preston: E. G. Heise, Sec.-Treas., Commission, V. P., Bernhardt, Chairman, Commission, C. S. MacKenzie, Superintendent, Commission; Sarnia: I. E. B. Phelps, Manager: Seaforth: John A. Wilson, Secretary, Commission: Smith's Falls: H. F. Shearer, Manager; St. Catharines: P. B. Yates, Manager; St. Thomas: E. H. Caughell, Manager: Stratford: R. H. Myers, Manager; Strathroy: E. R. Smithrim, Superintendent and Sec.-Treas.; Sudbury: R. H. Martindale, Superintendent; Tillsonburg: J. E. Teckoe, Superintendent; Toronto: E. M. Ashworth, Assistant General Manager, F. W. Peasnell, Chief Inspector, A. W. J. Stewart, Manager Appliance Dept.; Ernest A. Flower, W. J. Hutcheson, J. Eckersley; Toronto Township: R. M. Parkinson, Superintendent; Trenton: F. C. Adsett, Local Manager, H.E.P.C.; Walkerville: W. J. Mc-Henry, Manager; Waterloo: George Grosz, Superintendent; Welland: H. E. Timmerman, Manager; Windsor: O. M. Perry, Manager; K. R. McLellan, S. L. Eisenhoffer, S. R. A. Clement, R. C. McCollum, T. C. James, Gordon Kribs, F. F. Espenschied, L. G. Ireland, J. U. Wilson, R. T. Jeffery, G. J. Mickler, R. M. Bond, Hydro-Electric Power Commission of Ontario, Office.

Address by Chairman Buchanan

Gentlemen:-

It is gratifying to see such a large number of delegates present as it shows great intrest in the proposed formation of the new association. There never was a time in the history of the Hydro-Electric movement when there was more need for the managers and engineers to get together and discuss the management and operation of their local plants. Foremost among the problems is the manner of handling the power shortage, the more efficient operation of the system with the aim of saving power. Again as there will not be sufficient power to cope with all demands until the Chippewa scheme is complete, there is the question of selecting new business with reference to its effect on the load factor of the system and with regard to true conservation of energy. By this I mean that so long as coal is being used for power purposes at an efficiency of from 5 to 10 per cent. that electric energy should not be used extensively for heating when coal may be used at 70 per cent. efficiency and while Hydro-Electric energy may be used for power purposes at an equal efficiency.

There are also questions of economical operation and how to cheapen and simplify war time extensions on account of the high costs of material and labor and also on account of the natural reluctance of the Municipal authorities to sanction the issue of debentures.

The adjustment of rates and the inspection department rules are other matters which always form good material for discussion.

As you have learned from the notices sent out, this meeting has for its main purpose reorganization. The present society is constituted as a branch of the O.M.E.A. whose objects are concerned mainly with matters of public policy and are not directly interested with technical and commercial education, methods of operation, or standardization of apparatus and materials. Three years ago the O.M.E.A. thought that the managers and engineers should take a more active part in this association and it was decided that the executive should include four members who were operating executives of municipal utilities. This addition to the committee probably expressed the idea that the managers and engineers collectively could render valuable assistance to the Municipal Electrical Utilities of Ontario, but as the Association is concerned with policies only, it is doubtful if the paid officers should vent their opinions against those of publicly elected representatives

The passing of this motion to have the engineers represented on the executive has not however, resulted in any good to the engineers' section. The chief obstacle to progress has been that no funds are available from the O.M.E.A. for the use of the Engineers' section,

so that this section has been entirely dependent on the hospitality and courtesies of the Hydro-Electric Power Commission.

This condition therefore brought your committee to consider re-organization and when the draft constitution was presented it obtained the hearty approval of the members of the O.M.E.A. and of the H.E.P.C.

Of course it must be remembered that not merely by changing the name and by adopting a new constitution will the association become a success. Officers must be chosen who will work hard and show great interest in the affairs of the association. In no small measure the organization will fulfill its mission if the individual members can be made active. We can discourse at length on the duty of each engineer to support the society for the good of the profession and the good of the municipalities, yet fall short if we fail to realize that the altruistic appeal is unfortunately usually second to the selfish. The Association must therefore give liberally to pay the average member for his time. A strong program of diversified interest must be presented. Provision must be made to supply papers on the latest theory and practice. The convention committee must provide the opportunity for the membership to gain the benefits that arise from personal contact and social intercourse. Dinners where the technical gives way to stories that melt the ice of diffidence must have a place. It is to be hoped therefore, that if the new Association is formed, all these objects will be attained. There

is no doubt associated with the Municipal Electrical Utilities of Ontario, material that can make an organization which will be of infinite benefit to the Province.

HITTOHER BOTTOM

Litany of the Trenches

Regarding this war, you are mobilized or not mobilized.

If you are not mobilized there is nothing to worry about.

If you are mobilized you have two alternatives.

Either you are at the front or in the reserves.

If you are in the reserves there is nothing to worry about.

If you are at the front you still have two alternatives.

Either you get hurt or you don't get hurt.

If you don't get hurt there is nothing to worry about.

If you do get hurt you still have two alternatives.

Either you get slightly hurt or seriously wounded.

If you get slightly hurt there is nothing to worry about.

If you get seriously wounded you have two alternatives:

Either you recover or you don't recover.

If you don't recover—well—you can't worry.

Who's Who in Hydro?



V. BUCHANAN was born May 7, 1887, in Hamilton, Lanarkshire, Scotland, the son of Gavin and Mary

(Kelly) Buchanan.

He was educated at Hamilton Academy and Allan Glens School, Glasgow, in 1907 and graduated from the Royal Technical College, Glasgow, Scotland.

After completing his education, Mr. Buchanan became assistant engineer in the laboratory of the Glasgow Electricity Department, where he was engaged in testing meters, lamps, coal and other materials and equipment. In 1908 and 1909 Mr. Buchanan connected was

with Sayers & Caldwell, consulting engineers of Glasgow on the electrication of the Lochgelly Coal Mines, Fifeshire. After the completion of this work, Mr. Buchanan came to Canada and was associated with H. J. Glaubitz, consulting engineer of Toronto, as resident engineer at the Artisian Well Pumping Plant, London, Ontario.

In 1911, Mr. Buchanan was appointed waterworks and electrical engineer for the Public Utilities Commission of London and in 1915 was made general manager. The Public Utilities Commission has control of the Waterworks, Electrical

Department, Parks, Natural Gas and Civic Fuel Yard.

Mr. Buchanan is an associate member of the Institution of Electrical Engineers, an associate member of the American Institute, Electrical Engineers, and he is also chairman of the association of Mun-



E. V. Buchanan

icipal Electrical Engineers.

He was married October 25, 1916 to Anna Eloise, daughter of late Fire Chief Clark, of London. Mrs. Buchanan died suddenly from pleurisy on December 15, 1917.

What is the Squidjalum?

By L. G. Ireland



FEW days ago I attended a performance in a Toronto theatre at which the question which heads this brief and simple story

was asked. In these days of stress and travail this question is of transcending importance and I feel it to be a duty to my fellow countrymen to set forth in my own poor way the key to this riddle of the ages—the key which I alone of living men possess. And in what more fitting place can the elucidation of this problem be set down than in this great journal of scientific thought in the compilation of which full many a pair of trusty shears has been worn out in honourable service?

The Squidjalum!—What memories are conjured up by the liquid tintinnabulations of its dulcet syllables! Its definition is not to be found in the popular and widely read work of the late Mr. Webster, nor yet in the India paper pages of the Encyclopædia Brittanica. No, my friends, although many other eminent scientists have given of their best in the effort to locate and study the habits of the Squidjalum in its native lair, Providence has vouchsafed to me the inestimable privilege of encountering this at-one-time-thought-to-be mythical creature and of learning its true nature, age, sex, nationality and

previous condition of servitude. Read, and you shall learn, even as I.

On a fair September morning (no, R. T., it was not at the seashore) in the ante-bellum epoch I stood upon the top of a hill looking toward the southward, where, in the distance could be descried a number of men busily engaged in digging holes at the roadside, while in the foreground a group of stalwarts were erecting a pole with bending pike-poles and straining shoulders, the while accompanied by the minute directions of a large, angular foreman. He spoke two languages-English and profane—with incredible fluency, particularly the latter, and I was as one sitting at the feet of Gamaliel as I listened with awe and admiration to the breadth and scope of the objurgations that flowed from his lips. Let some hapless wight but stray from the path of duty and in an instant he was shrivelled as by a blast of flame.

The morning sun was mounting in the heavens and the ruddy leaves already stained with Autumn's pigments stirred gently and whispered to themselves. The little brook brawled noisily over the stones and grumbled at the approach of the long cold nights when the icy fingers of winter would be laid upon it and the good brown earth be mantled deep with snow.

Appeared now in the far distance a cloud of dust, at first no larger than a man's hand and by and by resolving itself into an equipage of ancient Roman date and scant renown drawn by a steed of mature years and contemplative visage. Nearer came this peripatetic heirloom of antiquity until the somnolent "clump, clump" of the ironshod hoofs became audible among the muffling billows of dust and roused me from my reverie. The sole occupant of the carriage was then made out to be a man of singularly unattractive mien, seated upon his shoulder blades and with his knees crossed and one leg wrapped lovingly around the other. Upon his head was a mildewed and weatherbeaten hat whose original hue had probably been grey, but which was now of a nondescript shade which would have delighted the heart of a camofleur. The upper part of his body encased in a broadcloth coat of a style known to a bygone generation as a cutaway. It had been black many years before, but now it was of a rusty green shade, and bearing every evidence of having braved a thousand years, the battle and the breeze. His nether garment was a pair of overalls which one dimly discerned to have been of a blueness in their days of pristine freshness. The spilled gravy of many a plate of hash had thoroughly permeated all the intricacies of the fabric and subsequent friction had produced a degree of polish which would have shamed the best efforts of a Greek bootblack. Upon his ample feet and falling in thick folds about

his ankles were a pair of socks of the variety known as "Government." Surrounding these were boots of a comfortable mould. I use the term "mould" advisedly. Surmounting a hickory shirt which scorned the effete adjunct of a collar were a leathern neck and bronzed face showing evidence of that rugged pioneer character which knew not the need of soap or bathtub. A luxuriant crop of facial shrubbery effectually concealed all his frontal characteristics except his eyes and nose, the former twinkling out under shaggy evebrows and the latter glowing ruddily and bulbously. His whiskers were—or should have been —white except in the vicinity of his mouth where they were stained a rich amber by the ensalivation of many years addiction to "Mac-Donalds Prince of Wales." This Jehu, upon catching sight of me, pulled sharply upon the reins and remarked "Whoa!" The ruminative palfrey thereupon ceased to move his legs, rested his weight on one side, lowered his head with a tired sigh and gently passed into slumber, his breath coming and going with windy suspirations. Then ensued the following dialogue:

Stranger: "Mornin'."

Me: "Good morning."

Long pause.

Stranger: "That's a purty fine day, ain't it?"

Me: "Yes."

Longer pause.

Stranger: "Are you one of these here 'lectric fellers?"

Me: "Yes."

Stranger: "Buildin' this here power line?"

Me: "Yes."

Stranger: "Are you the feller that settles for trees that's cut?"

Me: "Yes."

Very long pause during which Jehu reached into his hip pocket, produced a plug of blackstrap thoughtfully gnawed off a liberal portion, masticated it carefully a few times, settled it comfortably into his cheek and spat a contemplative stream of juice into the dust.

Stranger: "What are you goin' to gimme for them trees of mine?"

Me: (Coming suddenly to life) "What trees?"

Stranger: "Why them trees down there, (pointing with his whip) the next forty rod down past Ezry Thompson's milkstand, on the East side of the road just inside the fence."

I looked, and there before me stretched the dusty highway past field after brown field and as far as eye could reach was neither tree nor shrub to grace the shadeless sward on the East side. I looked again and rubbed my eyes and looked once more and all the while Jehu transfixed me with a baleful glare. I said: "You will pardon me, stranger but my eyes must be failing in their duty, and I would fain ride with you to the designated spot and there examine and inspect these trees of which you speak and place a value thereon." He responded succinctly "Climb in, Giddap, goldurn ya!" The steed roused from his slumber, settled himself into the harness, lifted first one foot

and then another and swung into his stride. Shortly we came to Ezry's milkstand and there we halted. We descended from the voiture and he led me to the rail fence. Pointing with a long and skinny forefinger he said: "There they are." I looked and saw, not trees, but a long row of haggled stumps at regular intervals of twenty five feet and extending the full length of forty rods (whatever that is). I said to him reproachfully, "But, my dear sir and brother, these are but the ghosts of trees; why do you ask me to pay you good coin of the realm for the right to cut down or otherwise destroy and remove trees which the evidence of my senses tells me you have removed six months ago?" "Wal, he said, "that's jest it; when I heer'd that you was buyin' right-of way and payin' for the right to cut trees I calc'lated that if I hadn'ta cut down them goldurned trees last April I coulda got fifty dollars outa ya anyhow, and I calc'lated that if I told you about it you'd do what's right and fair. I'm a poor man and only want my own and if I'd only a knowed last Spring when I cut down them trees to let the sun in to the fields that ya was goin' to build this here power line I'd let them stand and got fifty dollars for them from ya and been saved all the work of cuttin' them down and totin' them out to to the back fifty and burnin' them."

Sadly I looked at him and went my way.

That, my friends and countrymen, that is the Squidjalum.



By F. F. Espenschied

Electric Vehicles in Snow Drifts



E have from time to time drawn attention to the possibility of much greater use for the electric vehicle and expressed the

opinion that despite the severe climate of Ontario, these conveyances have great possibilities.

In the Electrical World of February, 16th, appears a short article showing what electric cars, both pleasure and commercial have done in Chicago during the present severe winter months. It is said that the snow fighting ability of commercial trucks has been well demonstrated, both trucks and passenger cars having come out of such tests very successfully with the result that they have gained greatly in popularity. Attention is drawn to a certain Pie Company which has operated sixty-three trucks through two severe blizzards in which the snow drifted in piles of from three

to ten feet all over the city. In spite of these severe conditions the trucks have made from thirty-two to fifty-two miles per day. The regular trips to Evanston, Oak Park, West Pullman, and other suburbs were made daily.

The large store of Marshall, Fields & Co., has stated that in its experience the electric trucks on short hauls in the city would conquer drifts that gasoline cars would not dare attack. When some of the company's big gasoline trucks stuck in drifts on the south side of the city, an electric truck was sent to pull them out and did so successfully. This company has maintained two deliveries a day in spite of the winter, except on the two days when there was no street traffic. The cars averaged thirty miles a day in the snow.

The Commonwealth Edison Company used one of its trucks to pull

a snowplow. No truck could pull the plow through the drifts with a direct hitch, in fact it was a feat for a truck alone to get through the drifts. The particular vehicle mentioned was fitted with a winch for pulling cable and in operating the snowplow, the truck would itself plunge through the drifts for a few hundred feet, when the driver would dig down to a man-hole and anchor the truck. The snowplow attached to the end of the hauling line would then be pulled up to the truck by the cable-pulling winch. The operation was repeated over the full length of the street to be cleaned.

Passenger cars have given equally satisfactory service in Chicago. The manager of one of the garages there took his own electric car out on the first morning after the heavy snowfall and drove fifty-two miles through drifts without chains. After this demonstration the other customers of the garage kept their electric cars continually in service and are said to be enthusiastic on the subject.

Results in Detroit are said to have been equally satisfactory. A certain company in Detroit after the first severe snowfall, telephoned its customers telling them to go ahead and use their cars and to call the factory for aid if they got into trouble. As a result of this, the company had only four "pull-ins" as against seventy-eight "pull-ins" which a certain eight cylinder gasoline car maker—with an equal number of cars out—had to his credit.

At Evansville, Indiana, the Com-

pany's dealer enlarged his list of prospective customers by going to the residential districts on mornings when other means of transportation failed, and inviting pedestrians to ride down town.

Owners of electric cars seem of the opinion that cars will pull through almost any depth of snow. They of course take more energy than usual, but that is true of any type of car. The speed will be lower, but with the street conditions as found after a blizzard, the electric car will go as fast as it is safe to drive.

After reading the above information and considering that snow conditions at the points mentioned were probably as severe as they were in Ontario this winter, it would appear that the field of the electric vehicle in this province, can and will be greatly enlarged. Suggestions have appeared recently that with proper enclosures for the battery compartments, and possibly a slight amount of heat during extra severe weather, the loss in storage capacity during winter weather can be largely avoided. There seems no good reason why this cannot be done. This loss in battery capacity during severe weather has been considered the greatest drawback to the use of electric vehicles in this climate. It is to be hoped that vehicle battery manufacturers will, by closer co-operation and more attention to heat insulation, overcome the prejudice to this type of vehicle in the colder districts.

HYDRO MUNICIPALITIES

NIAGARA SYSTE	EM		Pop.	EUGENIA SYSTEM
25 Cycles		Sarnia	11,676	60 Cycles
25 Gyeles		Seaforth	1,964 4,061	Alton Pop. 700
Acton	Pop.	Simcoe Springfield	442	Artemesia Township
Acton	1,735 586	of Catharines.,	17,880	Artnur 1,041
Ayr	800	St. GeorgeSt. Jacobs	600 400	Chatsworth
Baden	710 503	St. Mary's. St. Thomas.	3,958 17,174	Dundalk 721
Beachville. Blenheim	1.424	St. Thomas	17,174	Dumam 1,000
Bolton	727	Stamford Township Stratford	3,418 17,081	Elmwood
Bothwell	703	Strathrov	2,998	Grand Valley 644
Brampton. Brantford.	4,041 25,420	Streetsville	539	Hanover
Brigden	500	Tavistock	1,009 504	Holstein
Brigden	400	Thamesville	769	Walkuait 909
Burgessville.	700 300	Thorndale	250	Mount Forest 1 041
CaledoniaChatham	1,217	Tilbury Tillsonburg	1,740 3,084	Orangeville. 2,493 Owen Sound. 11,910 Shelburne 1115
Chatham	12,863	loronto	463,705	Shelburne 1,115
Clinton	2,177 800	Toronto Township	4,875	Tara 590
Dashwood	350	Vaughan Township Walkerville	4,187 5,096	Total 30,877
Delaware Dorchester	350	wallaceburg	4,107	
Dresden	400 1,521	Waterdown	785	OTTAWA SYSTEM
Drumbo	400	Waterloo	1,133 4,956	60 Cycles Ottawa
Dublin Dundas	218	Waterloo Township	6,693	PORT ARTHUR SYSTEM
Dundas	4,652 870	Watford	1,221	60 Cycles
Elmire	2,270	Welland	7,243 724	Port Arthur 14,307
Elora,	1,115	West Lorne Wellesley Weston Windsor Woodbridge Woodstock	583	MUSKOKA SYSTEM
Embro Etobicoke Township	483 5,711	Weston	2,156	60 Cycles
Exeter	1,572	Windsor	24,162	Gravenhurst 1,702
Fergus	1,776	Woodstock	639 10,084	Huntsville 2,395
Forest	1,495 11.852	Wyoming	544	Total 4,097
Galt	1,905	Zurich	450	CENTRAL ONTARIO SYSTEM
Georgetown	4,655	Total	993,862	60 Cycles
Grantham Township	3,271	1 Otai		
Constitution 20 million prints.				Belleville 12,277
Granton	300	SEVERN SYSTEM		Belleville
GrantonGuelphHagersville	300 16,735 1,105	SEVERN SYSTEM		Belleville
Granton Guelph Hagersville Hamilton	300 16,735 1,105 100,461	60 Cycles		Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012
Granton Guelph Hagersville Hamilton Harriston	300 16,735 1,105 100,461 1,404	60 Cycles Barrie	f 6,453	Belleville 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221
Granton. Guelph Hagersville Hamilton. Harriston. Hensall	300 16,735 1,105 100,461	60 Cycles Barrie Camp Borden Coldwater	6,453 579	Belleville 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221
Granton Guelph Hagersville Hamilton Harriston. Hensall. Hespeler Highgate.	300 16,735 1,105 100,461 1,404 749 2,740 500	60 Cycles Barrie	f 6,453	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Descronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176	60 Cycles Barrie Camp Borden Coldwater Collingwood Creemore Elmvale	6,453 579 6,361 585 775	Belleville 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221 Kingston 21,325 Lindsay 7,481 Madoc 1,179 Millbrook 835
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350	60 Cycles Barrie Camp Borden Coldwater Collingwood Creemore Elmvale Midland	6,453 579 6,361 585 775 6,258	Belleville 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221 Kingston 21,325 Lindsay 7,481 Madoc 1,179 Millbrook 835
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326	60 Cycles Barrie Camp Borden. Coldwater. Collingwood Creemore. Elmvale Midland Orillia	6,453 579 6,361 585 775	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto. 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326 58,055	60 Cycles Barrie Camp Borden Coldwater Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol.	6,453 579 6,361 585 775 6,258 7,448 3,928 500	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326	60 Cycles Barrie Camp Borden Coldwater Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol. Stavner	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972	Belleville 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221 Kingston 21,325 Lindsay 7,481 Madoc 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newcastle 611 Omemee 482 Orono 700
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Ljstowel London Lynden Milton	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326 58,055 662 2,072	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner. Victoria Harbor	6,453 579 6,361 585 775 6,258 7,448 3,928 500	Belleville. 12,277 Bowmanville. 3,655 Brighton 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newcastle. 611 Omemee 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Ljstowel London Lynden Milton	300 16,735 1,105 100,461 1,404 749 2,740 5,000 5,176 19,266 3,50 2,326 682 2,072 893	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee 2,926 Newburgh 486 Newcastle 611 Omemee 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope 4,649
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ligersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Mitchell	300 16,735 1,105 100,461 1,404 749 2,740 5,176 19,266 3,50 2,326 58,055 662 662 2,072 893 1,976 1,687	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner. Victoria Harbor	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600	Belleville. 12,277 Bowmanville 3,655 Brighton 1,337 Cobourg 4,712 Colborne 1,012 Deseronto 2,221 Kingston 21,325 Lindsay 7,481 Madoc 1,179 Milbrook 835 Napanee 2,926 Newburgh 486 Newcastle 611 Omemee 482 Orono 700 Oshawa 8,240 Port Hope 4,649 Port Hope 4,649 Port Hope 4,649 Srirling 732
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Michell Mount Brydges	300 16,735 1,105 100,461 1,404 749 2,740 5106 19,266 350 2,326 662 2,072 893 1,976 1,687 500	60 Cycles Barrie Camp Borden Coldwater Collingwood. Creemore Elmvale Midland Orillia Penetang Port McNichol. Stayner Victoria Harbor. Waubaushene Total	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600 35,936	Belleville. 12,277 Bowmanville. 3,655 Brighton 1,337 Cobourg. 4,712 Colborne 1,012 Deseronto 2,221 Kingston 21,325 Lindsay 7,481 Madoc 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newburgh 486 Newcastle 611 Omemee 482 Orono 700 Oshawa 8,240 Peterboro 20,426 Port Hope 4,649 Stirling 782 Trenton 5,000
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mintoo Mitchell Mount Brydges New Hamburg Meel Hamburg	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326 58,055 662 662 2,072 893 1,976 1,687 500 1,543	60 Cycles Barrie Camp Borden Coldwater Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol. Stayner Victoria Harbor. Waubaushene Total	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600 35,936	Belleville. 12,277 Bowmanville. 3,655 Brighton 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newburgh 486 Newastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope 4,649 Stirling 782 Trenton. 5,000
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milwerton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls	300 16,735 1,105 100,461 1,404 749 2,740 5,176 19,266 350 2,526 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cyles	6,453 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600 35,936	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colbourg. 1,012 Descrotto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee 2,926 Newburgh 486 Newcastle 611 Omemee 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope 4,649 Stirling. 732 Trenton. 5,000 Tweed 1,364 Whitby 2,864
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milton Milton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich	300 16,735 1,105 100,461 1,404 749 2,740 5,176 350 2,326 662 2,072 893 1,976 1,543 1,186 11,147 1,189	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cyles Beaverton. Brechin	6,453 , 579 6,361 585 775 6,258 5,448 3,928 500 972 1,477 600 35,936 EM	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Descrotto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milwerton Minico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs	300 16,735 1,105 100,461 1,404 749 2,740 500 5,176 19,266 350 2,326 662 2,326 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147 1,1189	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood Creemore. Elmyale. Midland. Orillia. Penetang. Port McNichol. Stayner. Victoria Harbor. Waubaushene. Total WASDELL'S SYSTE 60 Cyles Beaverton. Brechin. Cannington.	6,453 	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 Total 104,514 NIPISSING SYSTEM
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milwerton Minico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs	300 16,735 1,105 100,461 1,404 7,49 2,740 5500 5,176 19,266 350 2,236 662 2,072 893 1,976 1,687 500 1,543 1,186 1,147 1,189 599 500 1,843	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cyles Beaverton Brechin Cannington Sunderland	6,453 , 579 6,361 585 775 6,258 5,448 3,928 500 972 1,477 600 35,936 EM	Belleville. 12,277 Bowmanville. 3,655 Brighton 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newburgh 486 Newastle. 6611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 NIPISSING SYSTEM 60 Cycles
Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Minico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris	300 16,735 1,105 100,461 1,404 749 2,740 5500 51,76 19,266 350 2,326 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147 500 1,843 4,370	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cyles Beaverton Brechin Cannington Sunderland Woodville	6,453 , 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600 35,936 EM	Belleville. 12,277 Bowmanville. 3,655 Brighton 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook 835 Napanee 2,926 Newburgh 486 Newburgh 486 Newastle. 6611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 Total 104,514 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Higgrace Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milton Milton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oll Springs Otterville Palmerston Paris Petrolia	300 16,735 1,105 100,461 1,404 2,740 2,740 55,176 350 2,326 682 2,072 893 1,976 1,687 500 1,543 1,186 11,147 1,189	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cyles Beaverton Brechin Cannington Sunderland Woodville	6,453 , 579 6,361 585 775 6,258 7,448 3,928 500 972 1,477 600 35,936 EM	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborre. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 Total 104,514 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Luynden Milton Milverton Minico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Pletsville Pletsville Pletsville Point Edward	300 16,735 1,105 100,461 1,404 2,740 2,740 5,176 5,176 19,286 350 2,226 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147 1,189 1,148	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood Creemore. Elmvale. Midland. Orillia. Penetang. Port McNichol. Stayner. Victoria Harbor. Waubaushene. Total WASDELL'S SYSTE 60 Cyles Beaverton. Brechin Cannington. Sunderland. Woodville. Total	6,453 	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400
Granton Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Minico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Pont Edward Port Credit	300 16,735 1,105 100,461 1,404 749 2,740 5500 5,176 19,266 350 2,326 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147 1,147 1,189 500 1,843 1,84	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood Creemore. Elmvale. Midland. Orillia Penetang. Port McNichol. Stayner. Victoria Harbor Waubaushene. Total WASDELL'S SYSTE 60 Cyles Beaverton. Brechin. Cannington. Sunderland. Woodville. Tot. ST. LAWRENCE SYS	6,453 	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 Total 104,514 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575
Granton Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Port Catalley	300 16,735 1,105 100,461 1,404 2,740 2,740 5,176 5,176 19,286 350 2,226 662 2,072 893 1,976 1,687 500 1,543 1,186 11,147 1,189 1,148	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore Elmvale Midland Orillia Penetang Port McNichol Stayner Victoria Harbor Waubaushene Total WASDELL'S SYSTE 60 Cycles Beaverton. Brechin Cannington Sunderland Woodville Tot ST. LAWRENCE SYS' 60 Cycles	6,453 , 579 6,361 585 775 6,258 7,448 3,928 500 9772 1,477 600 35,936 EM 1,015 215 903 570 388 at 3,091 TEM 9,428	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575 Total 11,480
Granton Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Port Catalley	300 16,735 1,105 100,461 749 2,740 5500 51,76 19,266 350 2,326 662 2,072 893 1,976 662 2,072 1,543 1,186 11,147 500 1,543 1,189 599 1,046 1,318 899 1,046 1,318	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood. Creemore. Elmvale. Midland. Orillia Penetang. Port McNichol. Stayner. Victoria Harbor. Waubaushene. Total WASDELL'S SYSTE 60 Cycles Beaverton. Brechin. Cannington. Sunderland. Woodville. Tot ST. LAWRENCE SYS' 60 Cycles Brockville. Chesterville.	6,453 , 579 6,361 585 775 6,258 500 972 1,477 600 35,936 EM 1,015 215 903 570 388 al 3,091 TEM 9,428 854	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colbourg. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee 2,926 Newburgh 486 Newcastle 611 Omemee 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed 1,364 Whitby 2,864 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575 Total 11,480 RIDEAU SYSTEM
Granton Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Port Catalley	300 16,735 1,105 100,461 1,404 749 2,740 550 2,236 662 2,072 893 1,976 1,543 1,186 1,147 1,189 509 1,843 4,370 3,891 1,843 4,370 3,891 1,318 849 4,643 660	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood Creemore. Elmvale. Midland. Orillia. Penetang. Port McNichol. Stayner. Victoria Harbor. Waubaushene. Total WASDELL'S SYSTR 60 Cyles Beaverton. Brechin. Cannington. Sunderland. Woodville. Tot ST. LAWRENCE SYS 60 Cycles Brockville. Chesterville. Cresterville. Cresterville. Colling of the collin	6,453 , 6,453 , 6,258 7,448 5,000 972 1,477 600 35,936 EM 1,015 215 903 570 388 al 3,091 TEM 9,428 854 2,740	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 Total 104,514 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575 Total 11,480 RIDEAU SYSTEM 60 Cycles
Granton Guelph Hagersville Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milwerton Mitwerton Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Port Credit Port Stanley Port Stanley Preston Princeton Ridgetown	300 16,735 1,105 100,461 1,404 749 2,740 5,106 3,50 2,326 662 2,972 893 1,976 1,687 500 1,543 1,186 11,147 11,147 11,148 1,343 1,189 500 1,343 1,344 1	60 Cycles Barrie. Camp Borden. Coldwater. Collingwood Creemore. Elmvale. Midland. Orillia Penetang. Port McNichol. Stayner. Victoria Harbor Waubaushene. Total WASDELL'S SYSTE 60 Cycles Beaverton. Brechin. Cannington Sunderland. Woodville. Tot ST. LAWRENCE SYS' 60 Cycles Brockville. Chesterville. Chesterville. Prescott. Williamsburg.	6,453 , 579 6,361 585 775 6,258 500 972 1,477 600 35,936 EM 1,015 215 903 570 388 al 3,091 TEM 9,428 854	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Deseronto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575 Total 11,480 RIDEAU SYSTEM 60 Cycles
Granton Granton Guelph Hagersville Hamilton Harriston Hensall Hespeler Highgate Ingersoll Kitchener Lambeth Listowel London Lucan Lynden Milton Milverton Mimico Mitchell Mount Brydges New Hamburg New Toronto Niagara Falls Norwich Oil Springs Otterville Palmerston Paris Petrolia Plattsville Port Catalley	300 16,735 1,105 100,461 1,404 749 2,740 550 2,236 662 2,072 893 1,976 1,543 1,186 1,147 1,189 509 1,843 4,370 3,891 1,843 4,370 3,891 1,318 849 4,643 660	60 Cycles Barrie Camp Borden Coldwater. Collingwood Creemore. Elmvale. Midland. Orillia Penetang. Port McNichol. Stayner. Victoria Harbor Waubaushene. Total WASDELL'S SYSTE 60 Cycles Beaverton. Brechin. Cannington Sunderland. Woodville. Tot ST. LAWRENCE SYS' 60 Cycles Brockville. Chesterville. Chesterville. Prescott. Williamsburg. Winchester.	6,453 , 579 6,361 585 775 6,258 500 972 1,477 600 35,936 EM 1,015 215 903 570 388 al 3,091 TEM 9,428 854 2,740 100	Belleville. 12,277 Bowmanville. 3,655 Brighton. 1,337 Cobourg. 4,712 Colborne. 1,012 Descrotto 2,221 Kingston. 21,325 Lindsay. 7,481 Madoc. 1,179 Millbrook. 835 Napanee. 2,926 Newburgh. 486 Newcastle. 611 Omemee. 482 Orono. 700 Oshawa. 8,240 Peterboro. 20,426 Port Hope. 4,649 Stirling. 732 Trenton. 5,000 Tweed. 1,364 Whitby. 2,864 NIPISSING SYSTEM 60 Cycles Callander. 650 Nipissing. 400 North Bay 9,855 Powassan. 575 Total 11,480 RIDEAU SYSTEM 60 Cycles Perth. 3,478

